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NOTES ON CLIMATOLOGY.

BY

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ATLAS OF METEOROLOGY.—The most important publication within the field of meteorology and climatology issued since the date of the "Challenger" *Report on Atmospheric Circulation* is certainly the new *Atlas of Meteorology*, prepared by J. G. Bartholomew and A. J. Herbertson, and edited by Dr. Alexander Buchan. This *Atlas of Meteorology* is Vol. III of Bartholomew's new Physical Atlas, and bears the date 1899. In 1887, twelve years ago, there was published an *Atlas der Meteorologie*, which formed a part of Berghaus' *Physikalischer Atlas*, and was prepared by Dr. Julius Hann, of Vienna. In Dr. Hann's atlas existing meteorological knowledge was summarized graphically on twelve plates, containing nearly sixty maps. The Berghaus atlas was superseded, so far as charts of temperature, pressure and winds were concerned, by the "Challenger" isothermal and isobaric charts, which embodied all the data available at the time of their publication. These "Challenger" charts have themselves had but limited use, because of their relatively high cost; but they have been reproduced on a small scale in several of the newer text-books of meteorology, and have thus become familiar to large numbers of persons.

The publication of the "Challenger" isothermal and isobaric charts, however, did not suffice to supply the need that has been increasingly felt during the last few years for a new atlas of meteorology, which should present all the latest information available for all parts of the world, and which should include not only charts of mean annual and mean monthly temperatures and pressures, but also charts of temperature ranges and anomalies; of rainfall, cloudiness, sunshine, etc. Bartholomew's new *Atlas of Meteorology* supplies this need fully, in every respect. Hann's atlas of 1887 contained, as has been stated, about sixty maps. This new Atlas contains over four hundred, all of them admirable examples of the highest development of present cartographic methods. In the preparation of this Atlas Messrs. Bartholomew and Herbertson have had the constant advice and assistance of Dr. Buchan, and have also been effectively aided by Drs. Hann, van Bebber, Köppen, Angot, and Messrs. Willis L. Moore, and John Eliot, and the late Mr. G. J. Symons. In fact the Atlas, as it stands, represents, in the phrase of the preface, "the position of meteorology at the close of the nineteenth century." The labor involved in the preparation of the charts must have been enormous, for the data used as the basis for them had to be collected from the publications of many countries. The bulk of this work has been done by Dr. Herbertson, who is entitled to the highest praise for the able manner in which he has handled this material.

The thirty-four plates of the Atlas are arranged so as to fall under two heads—Climate and Weather. Under the former heading come the mean annual and mean monthly isothermal charts for the world, and for certain special countries, such as Europe, the United States, and India; the mean annual and the mean monthly isobaric and wind charts; the charts of sunshine, cloudiness, rainfall, etc. Under the second heading, Weather, there are charts showing the conditions under which typical and anomalous weather occurs in different countries. The pressures which prevail in abnormally hot or cold seasons and months in various countries, and which produce certain types of weather or certain kinds of winds, storm tracks and storm frequencies in different parts of the world,—these and other subjects are charted among the maps illustrating the general subject of weather. It is impossible to do this Atlas justice in a brief note. Recognizing the limitations of the work, as to size and number of maps, it seems to us impossible for anyone justly to utter a word of unfavorable criticism of the volume. Everything that anyone could wish for seems to us to be included. Both English and metric systems are used on the pressure and rainfall charts, and both Fahrenheit and Centigrade degrees are given on the temperature charts. The scheme of coloring is admirably adapted to bringing out the facts with the greatest clearness. If we were asked to name the two most important features of this new Atlas, we should say that they are as follows:—First, the charts showing the mean rainfall for the whole world for every month of the year. Second, the emphasis which is laid upon the weather types, normal and abnormal, of which climate is made up. Climate has too long been a dead mass of averages. The individual weather types which go to make up these averages have been hitherto almost wholly disregarded. The *Atlas of Meteorology* is certain to be welcomed not by meteorologists only, but by all men of science. It is one of the most notable scientific publications issued in many years.

THE CLIMATIC ZONES OF SIBERIA.—An article by J. Y. Simpson, entitled *The New Siberia*, in the *Scottish Geographical Magazine* for January, lays emphasis upon the climatic zones of Siberia and the relations of these zones to human occupation. The country may be divided into three broad east and west zones. The tundra comes furthest north; then the taiga or belt of virgin forest, and lastly the more open zone to the south, which is largely agricultural. Between this last zone and the southern frontier come further the steppe region and the Russian slopes of the Altai and Sayan Mountains. In the tundra the subsoil is always frozen, the surface is a swamp in summer, where lichen and moss alone can grow. The climatic difficulty in the case of the tundra zone

> does not lie in the small number of degrees of heat registered in summer . . . but in the relative shortness of the summer that succeeds the long winter, and in the great extremes that are reached within so brief a period. Hence, it is not easy to imagine how—unless in the event of such circumstances as have lately made Klondike appear to many to be a desirable place of residence—this tundra zone will ever be of service to the Russian Empire, or support a population other than that of the scant subarctic tribes to whom its wastes are home.

The belt of virgin forest overlaps the tundra on the south, and is the largest of the three zones, occupying almost half of Siberia. The climate is somewhat less rigorous than on the tundra,

> but agriculture is almost entirely impracticable unless with enormous trouble in certain well-favoured clearings. For the rest, it is an interminable maze of Siberian poplar, spruce, larch, cedar, fir, and pitch pine, with a dense undergrowth, a place of gloom below and silent conflict in mid-air. From the south, however, this forest belt is being slowly attacked with hatchets, and, as it were, pushed farther north, so that one day the land will support many more than the 700,000 Russians and natives who at present are resident within it.

South of this forest belt comes the more open, agricultural zone, in which cereals can be grown. Here the summer is longer, and here the Trans-Siberian Railway is destined to work a revolution by bringing in hundreds of thousands of Russian peasants to till the soil, which is often very rich,—so rich indeed in many places that thirty to forty crops may be gathered without giving any long interval for the repose of the ground.

OSCILLATIONS OF CLIMATE AND THE QUALITY OF THE GRAPE CROP.—*Ciel et Terre* for March 1 notes that the association of German vine-growers has published detailed tables concerning the quality of the wine produced between the years 1820 and 1895. It appears that the quality of the wine is closely related to the temporary fluctuations of climate. During dry and hot periods, corresponding to the years about 1830 and 1860, the wine obtained from all the German vineyards was, as a rule, superior to that obtained during the years about 1850 and 1880. Since the last-named year the average quality of the wine has noticeably improved. In all the grape-growing districts the curves of these two variables maintain a parallelism. The fact is, therefore, a striking confirmation of the oscillations of climate.